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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/756,876

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Christian T. Goralski JR.

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ALLEMAN HALL MCCOY RUSSELL & TUTTLE, LLP
806 S.W. BROADWAY, SUITE 600
PORTLAND, OR 97205

EXAMINER

NGUYEN, TU MINH

ART UNIT

PAPER NUMBER

3748

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/756,876	Applicant(s) GORALSKI ET AL.	
	Examiner TU M. NGUYEN	Art Unit 3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 October 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-7 and 17-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-7 and 17-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 October 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. An Applicant's Amendment filed on October 1, 2008 has been entered. Claims 1 and 17 have been amended. Overall, claims 1, 2, 4-7, and 17-19 are pending in this application.

Drawings

2. The formal drawings filed on October 13, 2007 have been approved for entry.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 1, 4-7, and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Poggio et al. (U.S. Patent 6,226,982) in view of Sawada et al. (U.S. Patent 5,970,707).**

Re claims 1 and 17, as shown in Figures 1-3 and indicated in the Abstract, Poggio et al. disclose a method for controlling an engine having an exhaust with an emission control device (6) adapted for storing oxygen during lean operating conditions, and converting at least a portion of the oxygen during stoichiometric or rich operating conditions, the method comprising:

- operating (during fuel cut-off operating condition) the engine to produce a lean exhaust gas mixture fed to the emission control device; and

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- after the lean operation, operating the engine to produce a rich exhaust gas mixture fed to the emission control device, the rich exhaust gas mixture having a rich air-fuel ratio, wherein the rich air-fuel ratio is selected as a function of at least the oxygen storage capacity of the device and temperature of the device, wherein the rich air-fuel ratio decreases with decreasing oxygen storage capacity at a slope that is steeper at higher temperatures than at lower temperatures (see at least Figures 3, 5, and 7, lines 9-23 of column 6, and lines 41-49 of column 6).

Poggio et al., however, fail to disclose that the emission control device is a NO_x trap adapted for storing NO_x during lean operating conditions, and converting at least a portion of the NO_x during stoichiometric or rich operating conditions.

As shown in Figure 1, Sawada et al. disclose an exhaust gas purification device for an internal combustion engine, comprising a NO_x trap (7). As indicated on lines 38-46 of column 2, Sawada et al. teach that the NO_x trap is adapted to store NO_x during lean operating conditions and to convert at least a portion of the NO_x during stoichiometric or rich operating conditions. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the NO_x trap taught by Sawada et al. in the method of Poggio et al., since the use thereof would have been routinely practiced by those with ordinary skill in the art to effectively remove harmful NO_x emissions in an exhaust gas stream.

Re claims 4 and 18, in the modified method of Poggio et al., the rich air-fuel ratio is selected to provide a select amount of CO and hydrogen.

Re claims 5-6 and 19, in the modified method of Poggio et al., the oxygen storage capacity of the device is determined based on device degradation (lines 24-32 of column 8),

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wherein the device degradation is based on at least one of an amount of sulfur contaminating the device and thermal degradation of the device.

Re claim 7, as taught in Sawada et al., in the modified method of Poggio et al., the oxygen storage capacity of the device is determined from rich to lean transition time (in Sawada et al., a rich to lean transition time (TSTL in Figure 6) is measured, which is then used in the routine in Figure 13 to compute a storage capacity (CATDOS) of the NO_x trap).

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Poggio et al. in view of Sawada et al. as applied to claim 1 above, and further in view of Kakuyama et al. (U.S. Patent 6,619,032).

The modified method of Poggio et al. discloses the invention as cited above, however, fails to disclose that the oxygen storage capacity of the device is based on an average of several rich to lean transition times.

As shown in Figure 1, Kakuyama et al. disclose an engine air-fuel ratio control based on an amount of oxygen stored in a catalytic converter device (3). As depicted in Figure 3 and indicated in the Abstract, lines 52-57 of column 5, and line 62 of column 7 to line 10 of column 8, Kakuyama et al. teach that it is conventional in the art to estimate an oxygen storage capacity of the device is estimated based on a temperature of the device; and that the oxygen storage capacity of the device is estimated based on an average of several rich to lean transition times. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Kakuyama et al. in the modified method of Poggio et al., since the use thereof would have been routinely practiced by those with ordinary skill in the art to control an engine air-fuel ratio based on a storage capacity of an emission control device.

Response to Arguments

6. Applicant's arguments with respect to the references applied in the previous Office Action have been fully considered but they are not persuasive.

In response to applicant's argument that Poggio et al. fail to disclose or suggest that "the rich air-fuel ratio decreases with decreasing oxygen storage capacity at a slope that is steeper at higher temperatures than lower temperatures" (page 6 of the Applicant's Amendment), the examiner respectfully disagrees.

As shown in Figures 5 and 7, Poggio et al. teach that during the "Correction T*" right after the "fine cut-off" point, a slope of the rich air-fuel ratio decreases (i.e., λ_{1m} approaches to 1) at a slope steeper when an oxygen storage capacity of a catalyst is still high; and the slope is less steep when the oxygen storage capacity is lower. And as illustrated in Figure 3 of Poggio et al., the oxygen storage capacity of a catalyst is directly proportional to a temperature of the catalyst in a range between T_{inf} and T_{sup} . Thus, Poggio et al. clearly disclose or suggest the claimed limitation in dispute.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Communication

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TMN

December 19, 2008

/Tu M. Nguyen/

Tu M. Nguyen

Primary Examiner

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